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IS 13233 (1991): Low Voltage High Current Arc Resistance Test - Method of Test [ETD 2: Solid Electrical Insulating Materials and Insulation Systems]

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Indian Standard

LOW VOLTAGE HIGH CURRENT ARC RESISTANCE TEST — METHOD OF TEST

UDC 621·315·619

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

October 1991

Price Group 1

Solid Electrical Insulating Materials Sectional Committee, ETD 2

FOREWORD

This Indian Standard, was adopted by the Bureau of Indian Standard, after the draft finalized by the Solid Electrical Insulating Materials Sectional Committee had been approved by the Electrotechnical Division Council.

The test method covered in this standard is for insulating materials to test their ability to withstand low voltage high current arcs.

In reporting the results of a test or analysis made in accordance, with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*) .

Indian Standard

LOW VOLTAGE HIGH CURRENT ARC RESISTANCE TEST — METHOD OF TEST

1 SCOPE

This standard covers the classification and method of test for insulating materials in so far as their ability to withstand low voltage high current arcs are concerned.

2 TERMINLOGY

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Arc Resisting

The material is considered to be arc resisting if it resists the action of an electric arc index conditions specified in Annex A.

2.2 Arc Resistance

It is the index assigned to insulating materials for the purpose of classification and is numerically equal to the number of arcs (up to a maximum of 200 arcs) required to ignite the material under conditions specified in Annex A.

2.3 Igniting

To ignite or to set on fire.

2.4 Ignitable

A material which is capable of being ignited.

2.5 Burning

To undergo combustion (*see* 2.6).

2.6 Combustion

The combustible material with a supporter of combustion producing heat and sometimes both heat and light.

2.7 Free Burning

A material which burns freely on ignition and continues to do so even after the removal of the source of ignition.

2.8 Inflammable

A material which is capable of being easily ignited.

ANNEX A

(*Clauses* 2.1 *and* 2.2)

METHOD OF LOW VOLTAGE HIGH CURRENT ARC RESISTANCE TEST

A-1 TEST SYSTEM

Two round electrodes each of diameter 3·2 mm, one of copper and another of stainless steel (303) are used. The copper electrode is fixed and provision should be there for movement of the stainless steel electrode. The copper electrode is sharpened to a 30° chisel point while the SS electrode to a 60° cone. The electrodes are set in a vertical plane at 45° to the insulation surface under test. The movable electrode is operated by an air piston which, in turn, is controlled by an external relay.

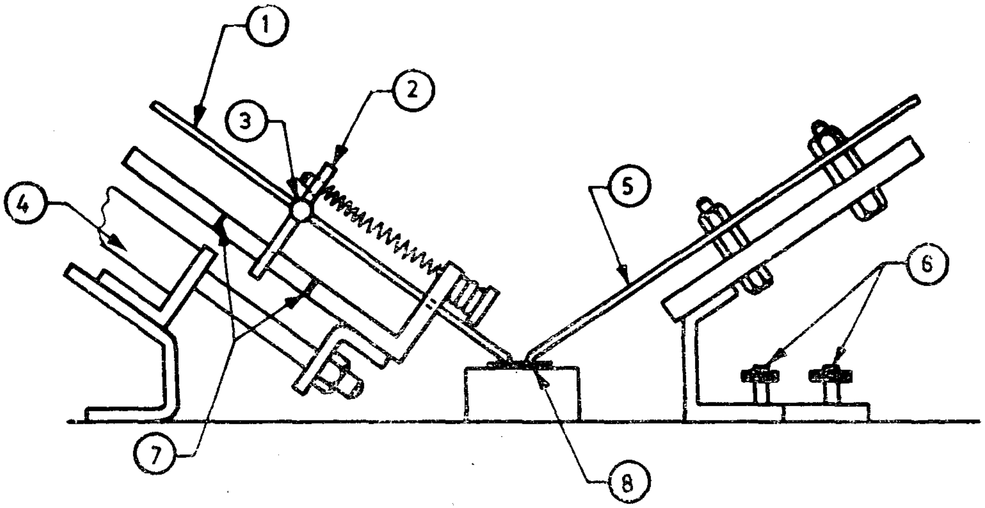
A-2 SOURCE

Power shall be supllied from a 240 V 50 Hz high capacity source. A series (inductive-resistive) air core impedance shall be used to give a short circuit current of 32·5 A and a power factor of 0·5. The SS electrode shall be drawn at the rate of 254 ± 25·4 mm/S so as to get 40 complete arcs per minute.

A-3 PROCEDURE

A-3.1 Five test specimens of 100 mm square are conditioned in accordance with **A-4.** The thickness of material shall be 6 mm. For specimens of higher thickness, one of the sides shall be machined to get a thickness of 6 mm. The specimen is placed in position and clamped suitably. Accurately sharpened SS electrode is mounted on the spring loaded holder with the holder in midposition and the tip of the electrode firmly touching the specimen surface. The electrode set screw is then tightened to hold the movable electrode and a locknut is used to prevent its loosening. The apparatus is shown in Fig. 1.

A-3.2 The movable electrode is then pulled away from the specimen until the electrode holder reaches the end. It is then released to snap down against the specimen which ensures correct position during normal operation.



1. SS Electrode	2. Electrode holder
3. Set Screw	4. Air piston
5. SS electrode	6. Screw for fixing the electrode assembly to the work table
7. Holder stops	8. Specimen

FIG 1. APPARATUS FOR LOW VOLTAGE HIGH CURRENT ARC RESISTANCE TEST

A-3.3 The fixed electrode assembly is moved away from the specimen and copper electrode is inserted and held in position by tightening the nut of the electrode holder. The electrode assembly is moved so that the chisel edge is in light contact with the point of the SS electrode. In this position the copper electrode assembly is firmly fixed to the horizontal work surface.

A-3.4 For greater consistency an oscilloscope may be connected across the electrodes to monitor voltage during dwell and arcing periods.

A-4 CONDITIONING

The test specimens are conditioned in a controlled atmosphere of 65 ± 5 percent RH and a temperature of 27 ± 2°C for 17 to 24 hours. The specimens are arranged so as to expose maximum surface of the specimen to the controlled atmosphere. The specimens shall be tested within 3 minutes after removal from the controlled atmosphere.

A-5 RESULTS

Average of five tests in which consistent and intense arcings are obtained shall be reported as the arc resistance of the material.

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